Layer 2, 3, and 4 Switches

Moving data efficiently and quickly

OSI Layer	Physical Component												
7-Application	Applicaton Software / Network Applications	LAN-Compatible Software E-Mail, Diagnostics, Word Processing, Database											
6-Presentation	Data-Conversion Utilities	Vendor-Specific Network Shells and Gateway™ Workstation Software											
5-Session	Network Operating System	SPX		NetBIOS		DECnet™	TCP/IP			AppleTal			
4-Transport		Novell® NetWare® IPX™		PC LAN	LAN Mgr	DECnet	PC/TCP®	VINES™	NFS	TOP$®			
3-Network Control													
2-Data Link	Network	E	A	TR	P	TR	E	TR	E	E		P	E
1-Physical		E=Ethernet; TR=Token Ring; A=ARCNET®; P=PhoneNET®											

The OSI model is the industry-standard conceptual view of networking.

With the rapid development of computer networks over the last decade, high-end switching has becon the most important functions on a network for moving data efficiently and quickly from one place to a

Here's how a switch works: As data passes through the switch, it examines addressing information att each data packet. From this information, the switch determines the packet's destination on the netwo creates a virtual link to the destination and sends the packet there.

The efficiency and speed of a switch depends on its algorithms, its switching fabric, and its processor. complexity is determined by the layer at which the switch operates in the OSI (Open Systems Interco Reference Model (see above).

OSI is a layered network design framework that establishes a standard so that devices from different work together. Network addresses are based on this OSI Model and are hierarchical. The more details included, the more specific the address becomes and the easier it is to find.

The Layer at which the switch operates is determined by how much addressing detail the switch reads passes through.

Switches can also be considered low end or high end. A low-end switch operates in Layer 2 of the OSI can also operate in a combination of Layers 2 and 3. High-end switches operate in Layer 3, Layer 4, o combination of the two.

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Layer 2 Switches (The Data-Link Layer)

Layer 2 switches operate using physical network addresses. Physical addresses, also known as link-la hardware, or MAC-layer addresses, identify individual devices. Most hardware devices are permanentl this number during the manufacturing process.

Switches operating at Layer 2 are very fast because they're just sorting physical addresses, but they aren't very smart—that is, they don't look at the data packet very closely to learn anything more abo headed.

Layer 3 Switches (The Network Layer)

Layer 3 switches use network or IP addresses that identify locations on the network. They read netwo addresses more closely than Layer 2 switches—they identify network locations as well as the physical location can be a LAN workstation, a location in a computer's memory, or even a different packet of d traveling through a network.

Switches operating at Layer 3 are smarter than Layer 2 devices and incorporate routing functions to a calculate the best way to send a packet to its destination. But although they're smarter, they may not if their algorithms, fabric, and processor don't support high speeds.

Layer 4 Switches (The Transport Layer)

Layer 4 of the OSI Model coordinates communications between systems. Layer 4 switches are capable identifying which application protocols (HTTP, SNTP, FTP, and so forth) are included with each packet, use this information to hand off the packet to the appropriate higher-layer software. Layer 4 switches packet-forwarding decisions based not only on the MAC address and IP address, but also on the applic which a packet belongs.

Because Layer 4 devices enable you to establish priorities for network traffic based on application, yo a high priority to packets belonging to vital in-house applications such as Peoplesoft, with different for rules for low-priority packets such as generic HTTP-based Internet traffic.

Layer 4 switches also provide an effective wire-speed security shield for your network because any co industry-specific protocols can be confined to only authorized switched ports or users. This security fe often reinforced with traffic filtering and forwarding features.

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